CLAIMS

What is claimed is:

1. A method for mapping platform-based design to multiple foundry processes, comprising steps of:

(a) defining a virtual process to include at least one fabrication process;

(b) storing, into a database, said virtual process in a representation including a list of attributes of entities making up said at least one fabrication process; and

(c) performing optimization of the database using mathematical and statistical tools.

2. The method of claim 1, wherein said at least one fabrication process is either a prefabrication step or a late metal step.

3. The method of claim 1, wherein said list includes at least one of design rules, physical parameters, temperature ranges, thicknesses, viscosities.

4. The method of claim 1, wherein said step (c) comprising:

(c1) using a first system of linear equalities and linear inequalities to describe operational characteristics and interactions of circuit elements;

(c2) evaluating said first system as a linear programming problem;

(c3) using a second system of linear equalities, at least one of linear inequalities and convex inequalities, and a linear or convex objective function to describe said operational characteristics and interactions of circuit elements; and

(c4) evaluating said second system as a convex optimization problem.

5. The method of claim 4, wherein said operational characteristics include timing

characteristics.

6. The method of claim 4, wherein said step (c2) is performed using at least one of the simplex method, Khachian's algorithm, and Karmarkar's algorithm.

7. The method of claim 4, wherein said step (c2) or said step (c4) is performed using convex optimization.

8. The method of claim 7, wherein said convex optimization uses at least one of Levin's algorithm, the Nemirovsky-Yudin-Shor method, a descent method, a barrier method, and a cutting-plane method.

9. The method of claim 7, wherein when said first system of linear equalities and linear inequalities as a totality is not a convex problem, decomposing said first system of linear equalities and linear inequalities to include a combination of convex sub-problems.

10. The method of claim 7, wherein when said first system or said second system appears in a non-convex form, recasting said first system or said second system in a convex form by problem decomposition or a change of variables to convert a non-convex problem or sub-problem into a convex problem or sub-problem.

11. The method of claim 1, further comprising finding properties of an optimal process for manufacturing at least one slice.

12. The method of claim 11, wherein said optimal process is amenable to accommodating an extension of said at least one slice in a particular direction.

13. The method of claim 1, further comprising running design properties for at least one slice into said database to allow various levels of comparison to take place between a slice space and a process space.

14. An apparatus for mapping platform-based design to multiple foundry processes, comprising:

(a) means for defining a virtual process to include at least one fabrication process;

(b) means for storing, into a database, said virtual process in a representation including a list of attributes of entities making up said at least one fabrication process; and

(c) means for performing optimization of the database using mathematical and statistical tools.

15. The apparatus of claim 14, wherein said at least one fabrication process is either a prefabrication step or a late metal step.

16. The apparatus of claim 14, wherein said list includes at least one of design rules, physical parameters, temperature ranges, thicknesses, viscosities.

17. The apparatus of claim 14, wherein said means (c) comprising:

(c1) means for using a first system of linear equalities and linear inequalities to describe operational characteristics and interactions of circuit elements;

(c2) means for evaluating said first system as a linear programming problem;

(c3) means for using a second system of linear equalities, at least one of linear inequalities and convex inequalities, and a linear or convex objective function to describe said operational characteristics and interactions of circuit elements; and

(c4) means for evaluating said second system as a convex optimization problem.

18. The apparatus of claim 17, wherein said operational characteristics include timing characteristics.

19. The apparatus of claim 17, wherein said means (c2) uses at least one of the simplex method, Khachian's algorithm, and Karmarkar's algorithm to solve said linear programming problem.

20. The apparatus of claim 17, wherein said means (c2) or said means (4) uses convex optimization to solve said linear programming problem or said convex optimization problem.

21. The apparatus of claim 20, wherein said convex optimization uses at least one of Levin's algorithm, the Nemirovsky-Yudin-Shor method, a descent method, a barrier method, and a cutting-plane method.

22. The apparatus of claim 20, further comprising when said first system of linear equalities and linear inequalities as a totality is not a convex problem, means for decomposing said first system of linear equalities and linear inequalities to include a combination of convex sub-problems.

23. The apparatus of claim 20, further comprising when said first system or said second system appears in a non-convex form, means for recasting said first system or said second system in a convex form by problem decomposition or a change of variables to convert a non-convex problem or sub-problem into a convex problem or sub-problem.

24. The apparatus of claim 14, further comprising means for finding properties of an optimal process for manufacturing at least one slice.

25. The apparatus of claim 14, wherein said optimal process is amenable to accommodating an extension of said at least one slice in a particular direction.

26. The apparatus of claim 14, further comprising means for running design properties for at least one slice into said database to allow various levels of comparison to take place between a slice space and a process space.

27. A computer-readable medium having computer-executable instructions for performing a method for mapping platform-based design to multiple foundry processes, said method comprising steps of:

(a) defining a virtual process to include at least one fabrication process;

(b) storing, into a database, said virtual process in a representation including a list of attributes of entities making up said at least one fabrication process; and

(c) performing optimization of the database using mathematical and statistical tools.

28. The computer-readable medium of claim 27, wherein said at least one fabrication process is either a prefabrication step or a late metal step.

29. The computer-readable medium of claim 27, wherein said list includes at least one of design rules, physical parameters, temperature ranges, thicknesses, viscosities.

30. The computer-readable medium of claim 27, wherein said step (c) comprising:

(c1) using a first system of linear equalities and linear inequalities to describe operational characteristics and interactions of circuit elements;

(c2) evaluating said first system as a linear programming problem;

(c3) using a second system of linear equalities, at least one of linear inequalities and convex inequalities, and a linear or convex objective function to describe said operational characteristics and interactions of circuit elements; and

(c4) evaluating said second system as a convex optimization problem.

31. The computer-readable medium of claim 30, wherein said operational characteristics include timing characteristics.

32. The computer-readable medium of claim 30, wherein said step (c2) is performed using at least one of the simplex method, Khachian's algorithm, and Karmarkar's algorithm.

33. The computer-readable medium of claim 30, wherein said step (c2) or said step (c4) is performed using convex optimization.

34. The computer-readable medium of claim 33, wherein said convex optimization uses at least one of Levin's algorithm, the Nemirovsky-Yudin-Shor method, a descent method, a barrier method, and a cutting-plane method.

35. The computer-readable medium of claim 33, wherein said method further comprising when said first system of linear equalities and linear inequalities as a totality is not a convex problem, decomposing said first system of linear equalities and linear inequalities to include a combination of convex sub-problems.

36. The computer-readable medium of claim 33, wherein said method further comprising when said first system or said second system appears in a non-convex form, recasting said first system or said second system in a convex form by problem decomposition or a change of variables to convert a non-convex problem or sub-problem into a convex problem or sub-problem.

37. The computer-readable medium of claim 27, wherein said method further comprising finding properties of an optimal process for manufacturing at least one slice.

38. The computer-readable medium of claim 37, wherein said optimal process is

amenable to accommodating an extension of said at least one slice in a particular direction.

39. The computer-readable medium of claim 27, wherein said method further comprising running design properties for at least one slice into said database to allow various levels of comparison to take place between a slice space and a process space.

40. A method for mapping platform-based design to multiple foundry processes, comprising steps of:

optimizing a first slice to a first foundry process including a first late metal step; and

optimizing a second slice to a second foundry process including a second late metal step,

wherein said first late metal step and said second late metal step share a functional, geometrical and electrical interface so that said first slice, after being implemented in said first foundry process, may be readily implemented in said second foundry process for metallization, and said second slice, after being implemented in said second foundry process, may be readily implemented in said first foundry process for metallization.